STEWARD v. AMERICAN LAVA COMPANY.

MORITZ KIRCHBERGER v. AMERICAN LAVA COMPANY.

CERTIORARI TO THE CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT.

Nos. 27, 28. Argued November 10, 11, 1909.—Decided November 29, 1909.

A patent cannot be sustained when the theory and method are introduced for the first time in unverified amended specifications.

The patent for a tip for acetylene gas burners, and for the process of burning acetylene gas, held to be void by the court below and by this court because the tip was not new, the description too indefinite, the amended specifications, which were unverified, brought in new matter and the claims for processes so called were only claims for the functions of the described tip.

155 Fed. Rep. 731, and 155 Fed. Rep. 740, affirmed.

THE facts are stated in the opinion.

Mr. Charles Neave, with whom *Mr. F. P. Fish* and *Mr. William G. McKnight* were on the brief, for petitioners.

Mr. Louis C. Raegener for respondents.

MR. JUSTICE HOLMES delivered the opinion of the court.

These are bills in equity brought by the petitioners to restrain the infringement of Letters Patent No. 589342, issued to the assignee of Edward J. Dolan, and dated August 31, 1897. The patent was held invalid by the Circuit Court of Appeals for the Sixth Circuit. *American Lava Co.* v. *Steward*, 155 Fed. Rep. 731 and 740; *S. C.*, 84 C. C. A. 157 and 166. It had been sustained by the Circuit Court of Appeals for the Second Circuit, *Kirchberger* v. *American Acetylene Burner Co.*, 128 Fed. Rep. 599; *S. C.*, 64 C. C. A. 107, and a writ of certiorari was granted by this court to the first-mentioned Circuit Court of Appeals.

The patent, so far as it comes in question here, is for a tip for acetylene gas burners and for the process of burning acety-

lene gas in the mode set forth. The court below held that the tip was not new, that the description was too indefinite, that the amended specifications brought in entirely new matter not sworn to, and that the claims for processes so called were only claims for the functions of the tip described.

A few words as to the conditions and knowledge at the time of the alleged invention will help to make the discussion plain. Acetylene gas began to be produced on a large scale for commercial purposes about 1895. It is very rich in carbon, and therefore has great illuminating power, but for the same reason coupled with the relatively low heat at which it dissociates and sets carbon free, it deposited soot or unconsumed carbon and soon clogged the burners then in use. It was possible to secure a complete consumption of carbon by means of the well-known Bunsen burner. This consists of a tube or cylinder pierced on the sides with holes for the admission of the air, into one end of which a fine stream of gas is projected through a minute aperture and from the other end of which it escapes and then is burned. A high pressure is necessary for the gas in order to prevent its burning back. The ordinary use of the Bunsen burner is to develop heat and to that end a complete combustion of course is desired. But with an immediately complete combustion there is little light. The yellow light of candles and gas jets is due to free particles of carbon at a red heat, but not yet combined with oxygen, or, as we commonly say, consumed. On the appearance of acetylene gas inventors at once sought to apply the principle of the Bunsen burner with such modifications as would produce this result. In doing so they found it best to use duplex burners, that is, burners the outlets of which were inclined toward each other so that the meeting of the two streams of gas formed a flat flame, and to let in less air.

In this state of things Dolan filed his application on February 18, 1897. The object was said to be "to provide a burner the use of which will result in perfect combustion of the gas and the production of a flame which will afford the greatest

possible degree of light from a given amount of gas consumed." A duplex burner on the Bunsen plan was described, but with no indication of any patentable device. The drawings were merely diagrams, and, with reference to what is to follow, we may mention that two of them show two sets of air holes, one above the other, and that the specification even now expressly allows 'two or more' sets. The claims were rejected on April 6, 1897, and in the same month Dolan changed his attorney. On May 20 a new specification and new claims were filed by the new attorney, but not sworn to by Dolan, and on these, with no material change, the patent was granted. In this specification, as in the former, though in different words, it is said that "in order to prevent the deposit of carbon within the burner or at the burner top and thereby insure a perfect combustion and a smokeless flame at the point where the same is formed, I provide a series of inclined air passages, *a*, *a*, which lead into the enlarged passage, E, above the point at which the contracted opening, C, is provided," [1] The inclined air

[1] The following are copies of Dolan's Fig. 1, and Fig. 2.

Fig. 1.

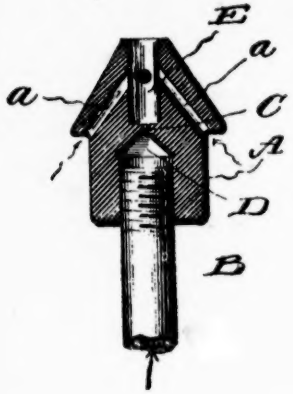
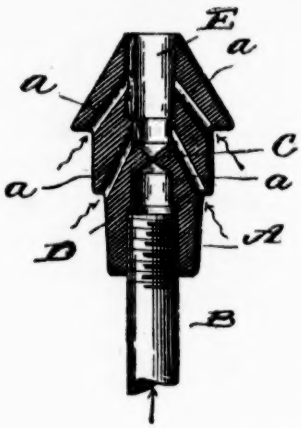


Fig. 2.



passages are the holes in the sides of the Bunsen burner, E is the cylinder, or tube, and the contracted opening, C, is the point at which the gas enters the tube. This device, and nothing else, is pointed out as the means for preventing the clogging of the tips. A preference is stated for a burner in duplex form.

In the new specification, however, it was said that the operation 'seems to be' that the gas draws in on all sides an envelope of air through the openings *a*, &c., so far stating the Bunsen principle, but adding that "the result of this arrangement seems to be to so cool the outside of the flame as to prevent any deposit of carbon at the point of egress." And another paragraph was as follows: "The structure of my burner is such that if all of the burner were cut off in a horizontal plane immediately above the outlet C [the point where the gas enters the upper chamber] the general shape and condition of the flame would not be modified, but in this case an immediate combustion would occur at the outlet. Under the conditions of this burner the point where the gas reaches its kindling temperature is carried upward, but the general shape of the escaping gas body is not materially modified." It was stated earlier that "the result here accomplished would not be accomplished in an ordinary air-mixing burner in which the air was mingled generally with the body of the gas," and that "in my burner an absolutely unobstructed passage is provided for the escape of the original jet of gas formed by the constricted opening C. By reason of this fact it is substantially necessary to have two jets if a flame of considerable candle power is desired."

The claims allowed and in controversy here are as follows:

"1. The process of burning acetylene gas, which consists in projecting a small cylinder of gas, in surrounding the same with an envelop of air insufficient to cause combustion of all the gas, and in finally supplying the gas with an additional amount of oxygen by allowing the stream of gas to expand

above the burner-tip into contact with the air, thereby burning the same, substantially as described.

"2. The process of burning acetylene gas, which consists in projecting toward each other two cylinders of acetylene gas, in surrounding the same with envelops of air insufficient to produce combustion of all the gas, and in finally causing the cylinders of gas to impinge upon each other and produce a flat flame, substantially as described.

"3. The combination in an acetylene-burner of the block A having the minute opening C, the cylindrical opening E, opening without obstruction to the atmosphere, and the air-passages *a*, substantially as described."

The ground upon which these claims are maintained is the theory indicated in one of the passages that we have quoted, to the effect that the gas emerges to the air surrounded by a mainly unmixed flow of air carried with it from the cylinder containing the holes *a*, *a*, and that this so cools the outside of the flame as to prevent a deposit of carbon. If this theory is not true and if all there is to the Dolan tip or burner is to provide for a mixture of air with the gas in the cylinder sufficient to secure complete combustion of all that is burned near the point of emergence, but insufficient to burn all the gas, the patent must fail. For this latter contrivance was well known, and if the shortness of the Dolan tip, which we are about to mention, has no other effect than to diminish the amount of air received it does nothing new. Moreover, unless the theory of the cooling envelop so dominates the specification as to explain what is doubtful and ambiguous in it, the claim would not be for what now is said to be the characteristic of the Dolan tip. The characteristic of the Dolan tip now is said to lie in the fact that the cylinder is very short, as, it is said, it must be for it to be true that the shape of the flame would not be modified by cutting it off. The shortness of the cylinder is supposed to prevent the mixing of the air and to produce the result desired.

But this theory of cooling not only is disputed in the testi-

mony and treated as speculative and highly doubtful by the courts below, but is discredited by the patent itself. The fourth claim is for a combination in an acetylene burner of two "air-mixing" burners. The theory was not that upon which Dolan was working, or in which he even now believes. He was a witness in the case and testified that it was his lawyer's contrivance, and while of course a mechanical device may be patentable although the true theory of it is not understood, here the words relied upon to show that the cylinder was to have this characteristic shortness also were the insertion of the lawyer, and would have had little importance apart from that newly adopted point of view. We should regret to be compelled to decide a case by the acceptance or rejection of a theoretic explanation upon which it still is possible that authorities in science disagree. But the uncertainty indicated even by the language of the patent is important in determining whether it describes a new invention in terms sufficiently precise to be upheld.

As we have said, the only passage indicating, even by indirection, the length of the cylinder, if that does, is the paragraph stating that if the burner were cut off the general shape and condition of the flame would be the same, which is thought to reproduce more exactly a suggestion in Dolan's specification as to a funnel shaped flame, said by him to result from the issue of gas with pressure through a small opening. But if the relative shortness of the cylinder had been understood to be an essential thing the patent naturally would have said so. It is suggested that the shortness is implied by the word tip in the patent, but the patent equally is said to relate to an improvement in burners, and the length of burners depends on the principle involved. In fact, all that directly bears upon length is the statement, which we have not yet mentioned, that the contracted opening for the gas into the cylinder is at or near the longitudinal center of the block constituting the tip. As the block may be longer or shorter, with no limits fixed, while the cylinder extends from the longitudinal center to the outlet

where the gas is burned, obviously the length of the cylinder, or one-half the block, may be greater or less, so far as we are informed by this portion of the patent. And when this is taken with the language as to mixing in the fourth claim: with the allowance of two or more sets of air holes, one above another; with the uncertain statement of the theory ('the operation seems to be,' 'the result seems to be';) and with the statement of the air holes alone as the feature that prevents the deposit, it seems to us impossible to say that sufficient instructions are given on the supposed vital point. Again, no proportions are indicated; the number, size and position of the air holes, except that they enter the cylinder above the gas, are left at large, and if the plaintiffs' theory is the true one, the public are told little more than to try experiments until they find a burner that works. The plaintiffs say that a burner with a distance of four-fifths of an inch or over between gas and discharge orifice is a Bunsen burner, and that for the burner to be effective for illuminating purposes the distance should be only a few millimeters. But if experiment had proved the contrary we cannot doubt that they equally would have claimed the successful burner as the one Dolan had contrived.

If, as now is said, a rat-tail flame is the mark of Dolan's burner, the words "funnel shaped" in the original application were not apt to describe it, and did not purport to indicate a test. They were used merely to show how the perfect combustion was achieved which is the declared object throughout. The cause assigned was not peculiar to Dolan's tip. The amendment, in the passage as to the unaltered shape of the flame when the burner is cut off, goes on to say that 'of course' the shape, though cylindrical as it issues from the round hole, increases in diameter, 'approximating in some degree to the form of an inverted cone.' This of itself almost excludes the notion that the rat-tail shape is the test, and no reader would draw that or any similar notion from the specification as a whole.

We appreciate the difficulties that would beset an attempt to make the directions more precise, but it certainly was possible to indicate with greater clearness the specific object to be attained, and that in any ordinary burner the tip must be very short. Vacillation in theory led to uncertainty of phrase. If, however, we are wrong, then it appears to us plain that Dolan's attorney introduced not merely the theory but the mode of applying it, for the first time, in the amended specification, or, in other words, then for the first time pointed to an invention, the essence of which was to have so short a chamber or cylinder as to prevent the mixing of the air taken into it and to emit the current of gas surrounded by the greater part of such air as an envelope or film. Of course, Dolan desired to produce the result which the patented article is said to produce, but beyond that desire his specification did not give a hint of the means by which it now is said to be achieved. It spoke, it is true, as we have said, of producing a hollow-shaped funnel flame by reason of the gas being forced through contracted openings at very great pressure. But this did not disclose the invention and was dropped in the amendment. He made no claim for a process and disclosed no invention of a device. This being so, the amendment required an oath that Dolan might have found it difficult to take, and for want of it the patent is void. Rev. Stat., § 4892. *Railway Co.* v. *Sayles*, 97 U. S. 554. *Eagleton Manufacturing Co.* v. *West, Bradley & Carey Manufacturing Co.*, 111 U. S. 490. *Kennedy* v. *Hazelton*, 128 U. S. 667. *De La Vergne Refrigerating Machine Co.* v. *Featherstone*, 147 U. S. 209, 229.

The patent was held void below on the further ground that it had been anticipated. We turn to this last because the question is complicated with the theory that we have mentioned. If the Dolan patent had unreservedly committed itself to the notion of a cooling envelope with a contrivance made very short for the purpose of securing that result, the argument in defense of it would be that the leading earlier patents proceeded upon the opposite theory of mixture and admitted, if

they did not contemplate, a longer tube, however similar otherwise they might be. They, at least, exhibit the state of the art at the date of the supposed invention, and show within what narrow and precise limits Dolan had to move if he was to produce anything new. So much may be said to be undisputed, and we have mentioned some of the facts that cannot be denied. But on the view that we have taken of Dolan's specification, they anticipate all that he can be said to have disclosed to the public. We think it unnecessary to go over much of the disputed ground and shall mention but two of the patents put in evidence. The most important of these is one issued in France to Bullier. This also was for a tip (*bec*) for acetylene gas. This tip was structurally similar to Dolan's, admitting the gas through a very small orifice and having the same slanting air passages entering the cylinder above and around the gas, and, in one drawing at least, entering it very near its upper end. Bullier definitely adopted the theory of mixture and stated the proportions—40 per cent of air to 60 per cent of gas—and, after stating his preference for a duplex burner, he added that in this manner the illuminating portion of the flames is relatively far from the orifice by reason of the air introduced, and that for the same reason the combustion of the carbon is complete between the orifice and the point where the flame flattens, the flame as it issues from the orifices being blue and not illuminating. In this way, he said, he avoided any deposit of carbon. The degree of mixture is affected by the length of the cylinder or tube, and when mixture is desired naturally a longer tube would be employed than when it is to be prevented. The drawings, which are admitted to be only diagrams, indicate a longer cylinder than Dolan's, and although Bullier does not state the length it will be perceived without more that if the plaintiffs' theory and construction of their patent were adopted the distinction insisted upon by them might be held to exist. Otherwise the anticipation is complete. It is significant that some of the plaintiffs manufacture under a Bullier license in France.

The other patent to be mentioned is another French one, to Letang. He also states, as means to prevent clogging, the removal of the outlet opening sufficiently far from the point of ignition and the cooling of the burner by a current of air. This current was produced by separate plates above the gas nozzle so arranged that a certain quantity of air would be carried along by the gas. It would seem from the diagram that the distance intended to exist between the nozzle and the flame was very short. We do not dwell upon the earlier patents in more detail, because we believe that we have said enough to show that the plaintiffs' cannot be sustained.

Decrees affirmed.

MR. JUSTICE MCKENNA dissents.